

**$\Lambda(1890) P_{03}$** 

$$I(J^P) = 0(\frac{3}{2}^+) \text{ Status: } ****$$

For results published before 1974 (they are now obsolete), see our 1982 edition Physics Letters **111B** (1982).

The  $J^P = 3/2^+$  assignment is consistent with all available data (including polarization) and recent partial-wave analyses. The dominant inelastic modes remain unknown.

 **$\Lambda(1890)$  MASS**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>1850 to 1910 (<math>\approx 1890</math>) OUR ESTIMATE</b>			
1897 $\pm$ 5	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
1908 $\pm$ 10	ALSTON-...	78	DPWA $\bar{K}N \rightarrow \bar{K}N$
1900 $\pm$ 5	GOPAL	77	DPWA $\bar{K}N$ multichannel
1894 $\pm$ 10	HEMINGWAY	75	DPWA $K^- p \rightarrow \bar{K}N$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
1856 or 1868	<sup>1</sup> MARTIN	77	DPWA $\bar{K}N$ multichannel
1900	<sup>2</sup> NAKKASYAN	75	DPWA $K^- p \rightarrow \Lambda\omega$

 **$\Lambda(1890)$  WIDTH**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>60 to 200 (<math>\approx 100</math>) OUR ESTIMATE</b>			
74 $\pm$ 10	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
119 $\pm$ 20	ALSTON-...	78	DPWA $\bar{K}N \rightarrow \bar{K}N$
72 $\pm$ 10	GOPAL	77	DPWA $\bar{K}N$ multichannel
107 $\pm$ 10	HEMINGWAY	75	DPWA $K^- p \rightarrow \bar{K}N$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
191 or 193	<sup>1</sup> MARTIN	77	DPWA $\bar{K}N$ multichannel
100	<sup>2</sup> NAKKASYAN	75	DPWA $K^- p \rightarrow \Lambda\omega$

 **$\Lambda(1890)$  DECAY MODES**

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1$ $N\bar{K}$	20–35 %
$\Gamma_2$ $\Sigma\pi$	3–10 %
$\Gamma_3$ $\Sigma(1385)\pi$	seen
$\Gamma_4$ $\Sigma(1385)\pi$ , <i>P</i> -wave	
$\Gamma_5$ $\Sigma(1385)\pi$ , <i>F</i> -wave	
$\Gamma_6$ $N\bar{K}^*(892)$	seen
$\Gamma_7$ $N\bar{K}^*(892)$ , <i>S</i> =1/2, <i>P</i> -wave	
$\Gamma_8$ $\Lambda\omega$	

The above branching fractions are our estimates, not fits or averages.

## $\Lambda(1890)$ BRANCHING RATIOS

See "Sign conventions for resonance couplings" in the Note on  $\Lambda$  and  $\Sigma$  Resonances.

$\Gamma(N\bar{K})/\Gamma_{\text{total}}$	$\Gamma_1/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>

**0.20 to 0.35 OUR ESTIMATE**

0.20±0.02	GOPAL	80	DPWA	$\bar{K}N \rightarrow \bar{K}N$
0.34±0.05	ALSTON-...	78	DPWA	$\bar{K}N \rightarrow \bar{K}N$
0.24±0.04	HEMINGWAY	75	DPWA	$K^- p \rightarrow \bar{K}N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
0.18±0.02	GOPAL	77	DPWA	See GOPAL 80
0.36 or 0.34	<sup>1</sup> MARTIN	77	DPWA	$\bar{K}N$ multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow \Sigma\pi$	$(\Gamma_1\Gamma_2)^{1/2}/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>

−0.09±0.03	GOPAL	77	DPWA	$\bar{K}N$ multichannel
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
+0.15 or +0.14	<sup>1</sup> MARTIN	77	DPWA	$\bar{K}N$ multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow \Lambda\omega$	$(\Gamma_1\Gamma_8)^{1/2}/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>

seen	BACCARI	77	IPWA	$K^- p \rightarrow \Lambda\omega$
0.032	<sup>2</sup> NAKKASYAN	75	DPWA	$K^- p \rightarrow \Lambda\omega$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow \Sigma(1385)\pi$ , <i>P-wave</i>	$(\Gamma_1\Gamma_4)^{1/2}/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>

$<0.03$	CAMERON	78	DPWA	$K^- p \rightarrow \Sigma(1385)\pi$
---------	---------	----	------	-------------------------------------

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow \Sigma(1385)\pi$ , <i>F-wave</i>	$(\Gamma_1\Gamma_5)^{1/2}/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>

−0.126±0.055	<sup>3</sup> CAMERON	78	DPWA	$K^- p \rightarrow \Sigma(1385)\pi$
--------------	----------------------	----	------	-------------------------------------

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow N\bar{K}^*(892)$	$(\Gamma_1\Gamma_6)^{1/2}/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>

−0.07±0.03	<sup>3,4</sup> CAMERON	78B	DPWA	$K^- p \rightarrow N\bar{K}^*$
------------	------------------------	-----	------	--------------------------------

### $\Lambda(1890)$ FOOTNOTES

- <sup>1</sup> The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit.
- <sup>2</sup> Found in one of two best solutions.
- <sup>3</sup> The published sign has been changed to be in accord with the baryon-first convention.
- <sup>4</sup> Upper limits on the  $P_3$  and  $F_3$  waves are each 0.03.

## $\Lambda(1890)$ REFERENCES

PDG	82	PL 111B	M. Roos <i>et al.</i>	(HELS, CIT, CERN)
GOPAL	80	Toronto Conf. 159	G.P. Gopal	(RHEL) IJP
ALSTON-...	78	PR D18 182	M. Alston-Garnjost <i>et al.</i>	(LBL, MTHO+) IJP
Also	77	PRL 38 1007	M. Alston-Garnjost <i>et al.</i>	(LBL, MTHO+) IJP
CAMERON	78	NP B143 189	W. Cameron <i>et al.</i>	(RHEL, LOIC) IJP
CAMERON	78B	NP B146 327	W. Cameron <i>et al.</i>	(RHEL, LOIC) IJP
BACCARI	77	NC 41A 96	B. Baccari <i>et al.</i>	(SACL, CDEF) IJP
GOPAL	77	NP B119 362	G.P. Gopal <i>et al.</i>	(LOIC, RHEL) IJP
MARTIN	77	NP B127 349	B.R. Martin, M.K. Pidcock, R.G. Moorhouse	(LOUC+) IJP
Also	77B	NP B126 266	B.R. Martin, M.K. Pidcock	(LOUC)
Also	77C	NP B126 285	B.R. Martin, M.K. Pidcock	(LOUC) IJP
HEMINGWAY	75	NP B91 12	R.J. Hemingway <i>et al.</i>	(CERN, HEIDH, MPIM) IJP
NAKKASYAN	75	NP B93 85	A. Nakkasyan	(CERN) IJP

---